

WHAT IS CLAIMED IS:

1. A Fe-Cr alloy structure containing about 6% to about 25% by mass of Cr, having a surface with at least one gap portion, and a corrosion-resistant film containing metal powder having ionization tendencies greater than iron on the surface, wherein said metal powder content in a dry paint film is about 20% to about 60% by volume, and wherein the dry paint film has a thickness of about 5 μm to about 100 μm .

2. The Fe-Cr alloy structure according to Claim 1, wherein said metal powder is one or more elements selected from the group consisting of Mg, Al, and Zn.

3. The Fe-Cr alloy structure according to Claim 1, wherein said corrosion-resistant film primarily contains epoxy resin, and the balance comprises a drying agent, a hardening agent, a plasticizer, a dispersant, and an emulsifier.

4. The Fe-Cr alloy structure according to Claim 1, wherein said metal powder is zinc in an amount, based on the weight of the paint film, which satisfies Expression (1):

$$70 - \{2.7 \times (\text{Cr} + 3.3\text{Mo})\} \leq X \leq 70 \quad (1)$$

wherein X is the metal zinc powder content (% by mass) in the paint film,

Cr is the Cr content (% by mass) in the Fe-Cr alloy,

and Mo is the Mo content (% by mass) in the Fe-Cr alloy.

5. The Fe-Cr alloy structure according to Claim 1, wherein the average particle diameter of said metal powder is about 3 μm or smaller.

6. The Fe-Cr alloy structure according to Claim 4, wherein the composition of said Fe-Cr alloy structure is, in terms of % by mass, about 0.020% or less of C, about 1.0% or less of Si, about 0.5% to about 5.0% or less of Mn, about 0.05% or less of P, about 0.02% or less of S, about 6% to about 20% of Cr, about 1.0% or less of Al, and about 0.03% or less of N, with the remainder being essentially Fe and unavoidable impurities, which forms an alloy steel with a tensile strength (TS) of about 450 to about 650 MPa, and wherein the dry paint film thickness of said dry paint film is about 5 to about 50 μm .

7. The Fe-Cr alloy structure according to Claim 6, wherein said Fe-Cr alloy structure further comprises, in terms of % by mass, about 3% or less of Mo, about 2% or less of Cu, and about 9% or less of Ni.

8. The Fe-Cr alloy structure according to Claim 6, wherein said Fe-Cr alloy structure further comprises, in terms of % by mass, about 0.0003% to about 0.005% of B.

9. An underside member of an automobile formed from the Fe-Cr alloy structure according to Claim 6.

10. The Fe-Cr alloy structure according to Claim 4, wherein said Fe-Cr alloy structure is a ferritic stainless steel, with a composition of, in terms of % by mass, about 0.1% or less of C, about 1.0% or less of Si, about 1.5% or less of Mn, about 0.06% or less of P, about 0.03% or less of S, about 1.0% or less of Al, about 11% to about 20% of Cr, and about 0.04% or less of N,

about 0.01% to about 0.8% of Nb and/or about 0.01% to about 1.0% of Ti, with the remainder being essentially Fe and unavoidable impurities.

11. The Fe-Cr alloy structure according to Claim 10, wherein said Fe-Cr alloy structure further comprises, in terms of % by mass, about 3.0% or less of Mo, about 2.0% or less of Cu, and about 2.0% or less of Ni.

12. The Fe-Cr alloy structure according to Claim 10, wherein said Fe-Cr alloy structure further comprises, in terms of % by mass, about 0.0003% to about 0.005% of B.

13. The Fe-Cr alloy structure according to Claim 6, wherein the average particle diameter of Zn in said Zn-containing dry paint film is about 3 μm or smaller.

14. The Fe-Cr alloy structure according to Claim 10, wherein the average particle diameter of Zn in said Zn-containing dry paint film is about 3 μm or smaller.

15. A fuel tank formed from the Fe-Cr alloy structure according to Claim 10.

16. A peripheral member of a fuel tank of an automobile formed from the Fe-Cr alloy structure according to Claim 10.

17. A method for manufacturing an Fe-Cr alloy structure comprising applying, on a surface an Fe-Cr alloy structure containing about 6% to about 25% by mass of Cr and including at least a gap portion, a corrosion-resistant film containing metal powder having ionization

tendencies greater than iron, to a dry film thickness of about 5 μm to about 100 μm , so that the content of said metal powder in the dry paint film is about 20% to about 60% by volume.

18. The method according to Claim 17, wherein said metal powder is one or more elements selected from the group consisting of Mg, Al, and Zn.

19. The method according to Claim 17, wherein said corrosion-resistant film primarily contains epoxy resin, and the balance comprises a drying agent, a hardening agent, a plasticizer, a dispersant, and an emulsifier.

20. The method according to Claim 17, wherein the metal powder is zinc in an amount, based on the weight of the paint film, which satisfies Expression (1):

$$70 - \{2.7 \times (\text{Cr} + 3.3\text{Mo})\} \leq X \leq 70 \quad (1)$$

wherein X is the metal zinc powder content (% by mass) in the paint film,

Cr is the Cr content (% by mass) in the Fe-Cr alloy,

and Mo is the Mo content (% by mass) in the Fe-Cr alloy.

21. The method according to Claim 17, wherein the average particle diameter of said metal powder is about 3 μm or smaller.

22. The method according to Claim 20, wherein the composition of said Fe-Cr alloy structure is, in terms of % by mass, about 0.02% or less of C, about 1.0% or less of Si, about 0.5% to about 5.0% of Mn, about 0.05% or less of P, about 0.020% or less of S, about 6% to about 20% or less of Cr, about 1.0% or less of Al, and about 0.03% or less of N, with the

remainder being essentially Fe and unavoidable impurities, which forms an alloy steel with a tensile strength (TS) of about 450 to about 650 MPa.

23. The method according to Claim 22, wherein said Fe-Cr alloy structure further comprises, in terms of % by mass, about 3% or less of Mo, about 2% or less of Cu, and about 9% or less of Ni.

24. The method according to Claim 22, wherein said Fe-Cr alloy structure further comprises, in terms of % by mass, about 0.0003% to about 0.005% of B.

25. The method according to Claim 20, wherein said Fe-Cr alloy structure is a ferritic stainless steel, with a composition of, in terms of % by mass, about 0.1% or less of C, about 1.0% or less of Si, about 1.5% or less of Mn, about 0.06% or less of P, about 0.03% or less of S, about 1.0% or less of Al, about 11% to about 20% of Cr, and about 0.04% or less of N, about 0.01% to about 0.8% of Nb and/or about 0.01% to about 1.0% of Ti, with the remainder being essentially Fe and unavoidable impurities.

26. The method according to Claim 25, wherein said Fe-Cr alloy structure further comprises one or more elements selected from the group consisting of about 3.0% or less of Mo, about 2.0% or less of Cu, and about 2.0% or less Ni in terms of % by mass.

27. The method according to Claim 25, wherein said Fe-Cr alloy structure further comprises, in terms of % by mass, about 0.0003% to about 0.005% of B.